

## CLAIMS

1. A process for preparing a peracid or diacylperoxide, characterized in that a mixed anhydride of formula  $R^1[C(O)OC(O)OR^2]_n$ , or  $[R^3C(O)OC(O)O]_pR^4$  is contacted with a hydroperoxide of formula  $R^5[OOH]_m$  in the presence of a base, wherein
  - 5       $R^1$  represents a mono-, di-, tri- or tetrasubstituted C<sub>1</sub>-C<sub>19</sub> hydrocarbon group, optionally containing one or more hetero atoms,
  - n is 1-4,
- 10      $R^2$  represents a C<sub>1</sub>-C<sub>20</sub> hydrocarbon group, optionally containing one or more hetero atoms,
- 15      $R^3$  represents a C<sub>1</sub>-C<sub>19</sub> hydrocarbon group, optionally containing one or more hetero atoms,
- 20      $R^4$  represents a di-, tri- or tetrasubstituted C<sub>1</sub>-C<sub>20</sub> hydrocarbon group, optionally containing one or more hetero atoms,
- 25     p is 2-4,
- $R^5$  represents hydrogen or a mono- or disubstituted C<sub>3</sub>-C<sub>18</sub> tertiary alkyl or C<sub>2</sub>-C<sub>20</sub> acyl group, in which the tertiary alkyl or acyl group may optionally contain one or more hetero atoms,
- m is 1 or 2, and
- if  $R^5$  represents hydrogen, m is 1,  
provided that if the hydroperoxide is an  $\alpha,\alpha'$ -dihydroperoxyperoxide, the reaction is not carried out in an inert two-phase solvent system comprising a polar solvent and an apolar solvent.
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2. A process according to claim 1, characterized in that n is 1 or 2.
3. A process according to claim 1, characterized in that  $R^1$  and  $R^3$  independently represents a linear or branched C<sub>4</sub>-C<sub>12</sub> alkyl or C<sub>6</sub>-C<sub>12</sub> aryl group, said alkyl and aryl groups optionally being substituted with a hydroxy group, a linear or branched C<sub>1</sub>-C<sub>4</sub> alkyl group or a halogen atom.

4. A process according to claim 1, characterized in that R<sup>2</sup> represents a C<sub>3</sub>-C<sub>8</sub> alkyl group or a C<sub>6</sub>-C<sub>12</sub> aryl group.

5 5. A process according to claim 1, characterized in that a mixed anhydride of formula R<sup>1</sup>[C(O)OC(O)OR<sup>2</sup>]<sub>n</sub> is used.

6. A process according to claim 1, characterized in that R<sup>5</sup> represents hydrogen or a monovalent C<sub>3</sub>-C<sub>18</sub> tertiary alkyl group.

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7. A process according to claim 1, characterized in that the base is an alkali metal hydroxide.

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8. A process according to claim 1, characterized in that the reaction is carried out at a pH of 5 or higher.

9. A process according to claim 1, characterized in that the reaction is carried out in the absence of an organic solvent.

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10. A process according to claim 1, characterized in that the mixed anhydride is prepared by contacting a carboxylic acid of formula R<sup>1</sup>[C(O)OH]<sub>n</sub> with a halogen formate of formula XC(O)OR<sup>2</sup> or [XC(O)O]<sub>p</sub>R<sup>4</sup> in the presence of a base in an aqueous medium, wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup>, n, and p have the same meaning as defined in claim 1 and X is a halogen atom.

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11. A process according to claim 10, characterized in that a quaternary ammonium phase transfer or tertiary amine catalyst is present.

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12. A hydroxydiacylperoxide obtainable by the process according to claim 1 wherein R<sup>1</sup> or R<sup>3</sup> represents a C<sub>1</sub>-C<sub>19</sub> hydrocarbon group, optionally containing one or more hetero atoms, substituted with a hydroxy group, n,

- R<sup>2</sup>, R<sup>4</sup>, and p have the meaning defined above, R<sup>5</sup> represents hydrogen or a mono- or divalent C<sub>2</sub>- C<sub>20</sub> acyl group, said acyl group optionally containing one or more hetero atoms, said acyl group optionally substituted with a hydroxy group, and m is 1 or 2, with the exception of benzoyl hydroxyacetyl peroxide, with the proviso that said hydroxydiacylperoxide does not contain a hydroxyphenyl moiety.
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13. Use of a hydroxyperoxide according to Claim 1 in bleaching, oxidation, epoxidation, chain transfer, radical (co)polymerization, or (co)polymer modification reactions.
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14. Use of a hydroperoxide according to Claim 1 in the preparation of poly(meth)acrylates.
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15. A hydroxyperacid obtainable by the process according to claim 12 wherein R<sup>1</sup> or R<sup>3</sup> represents a C<sub>1</sub>-C<sub>19</sub> hydrocarbon group, optionally containing one or more hetero atoms, substituted with a hydroxy group, n, R<sup>2</sup>, R<sup>4</sup>, and p have the meaning defined above, R<sup>5</sup> represents hydrogen, and m is 1.
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16. Use of a hydroxyperoxide according to Claim 13 in bleaching, oxidation, epoxidation, chain transfer, radical (co)polymerization, or (co)polymer modification reactions.